

Station (69°00'S, 39°35'E).

I. Interannual variation of Antarctic atmosphere

- 1) Radiation and cloud distribution
 - . Satellite observation (NOAA HRPT data receiving and processing of AVHRR data)
 - . Radiation measurement (shortwave, longwave and microwave; surface, airborne, sonde)
- 2) Extension of meteorological observing area
 - . Surface synoptic observation at Asuka Camp (71°32'S, 24°08'E, 965 m a.s.l.)
 - . Establishment of automatic weather station at Mizuho Station (70°42'S, 44°20'E, 2230 m a.s.l.) and S18 point (69°02'S, 40°07'E, 620 m a.s.l.)
- 3) Monitoring of minor constituents
 - . CO₂ continuous measurement by NDIR
 - . Air sampling (surface, airborne)
 - . Total ozone by Dobson spectrophotometer and vertical profile by sonde
 - . Aerosol sampling on research ship "SHIRASE"

II. Air-Sea ice interaction

- . Airborne microwave (19 GHz) measurements of ice sheet and sea ice as a ground truth of satellite observation
- . Sea ice distribution by the AVHRR data

For details, refer to T. YAMANOUCHI and H. TAKABE (*Antarct. Rec.*, **32**, 53, 1989).

(Received November 19, 1988)

SEASONAL VARIATION OF SNOW COVER OVER THE NORTHERN HEMISPHERE: PROGRESSION OF SNOWMELT (ABSTRACT)

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Seasonal variation of snow cover over the Northern Hemisphere is examined. The NOAA/NESDIS weekly snow cover data for the 14-year period from 1973 to 1986 are used. The data set is a digitized version of NOAA/NESDIS snow cover charts, which in turn are based on manual analysis of visible imageries taken by NOAA and other satellites. The data set tell whether each of 89×89 grid boxes on a polar stereographic map is covered with snow or not.

We analyzed the progression of snowmelt in spring. By "the week of snowmelt" (for a certain grid box and a certain year), we mean the week just after the one when snow cover is last observed within the period between No. 1 (early January) and week No. 30 (late July). Fourteen-year mean and interannual standard deviation of the week number of snowmelt are calculated and mapped.

The part of continents where snow cover usually exists until March can be classified into "plain" areas and "mountain" areas. In "plain" areas, in many-year average, snowmelt proceeds rather smoothly from south to north at a speed of 10 degrees latitude per month. In addition, a general trend in the progress of snowmelt from west to east is superposed in the European/Western Siberian as well as North American plain areas. Some irregularities in propagation are found. For example, across the Ural Mountains, snowmelt occurs about one

week earlier to the east than to the west. In individual years, the progression is much more patchy. Snowmelt over a contiguous area of the order of magnitude of $(1000 \text{ km})^2$ is often observed in one week.

Some mountain areas, such as Pamir Highland/Himalayas, Altai Mountains, Stanovoi Highland/Yablonovyi Mountains, Alaskan and Canadian Rocky Mountains, etc. are characterized by late snowmelt season. In particular, snow cover lasts until June in the Stanovoi/Yablonovyi area, although the ground is only about 2000 m above sea level. In other mountain areas, such as the Tibetan Plateau, Mongolian Plateau and Rocky Mountains in the U.S.A., interannual variability of the "week of snowmelt" is large.

(Received October 31, 1988)

ON GENERATION MECHANISM OF ICE-OCEAN EDDIES OFF HOKKAIDO COAST IN THE SEA OF OKHOTSK (ABSTRACT)

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Off the coast of Hokkaido in the Sea of Okhotsk, shore-based radars have revealed that an eddy-like pattern (ice-ocean eddy) or backward wave breaking pattern is sometimes observed in the ice floe distribution. A typical ice-ocean eddy is shown in an aerial photograph in the Asahi Shinbun, January 12, 1987. It shows that the ice-ocean eddy is composed of numerous pancake ice floes of diameter about 10 m.

First we investigated the characteristics of these eddies using radar images. These patterns seem to be generated when the ice concentration is small and the wind is weak after strong northerly wind blows. They are mostly observed off the coast of Esashi and Ohmu, near the Soya Strait. They often appear as a vortex train. The scale of the eddies is about 20–30 km and the wavelength of the vortex train is about 50 km.

Next we examine the generation mechanism of these eddies, assuming that sea ice floes act as a tracer for the ocean velocity. The Soya Warm Current which flows in this region is modeled. The model suggests that on this current wave motion is induced by barotropic instability. Using this model, we simulate the behavior of sea ice floes which are driven by wind and oceanic flow. We can reproduce quite similar pattern to observed eddy-like pattern or backward wave breaking pattern. This suggests that the wave motion occurs in the ocean and that the sea ice floes visualize such motion as a tracer.

(Received November 2, 1988)